### INTERNAL ASSESSMENT TEST1

**Date**: 30/08/2017  
**Marks**: 40  
**Subject & Code**: Operating System – 15EC553  
**Sem & Sec**: 5th A,B,C  
**Name of faculty**: Bivas Bhattacharya  
**Time**: 11:30am - 1:00pm  

**Note**: Answer FIVE full questions, selecting any ONE full question from each part.  

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<td>a. Is OS necessary for a computing system? Explain.</td>
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<td>b. Explain 3 layer model for operation of OS with each layer example.</td>
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<td>b. Explain how stack segment is used for function call.</td>
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<td>9</td>
<td>a</td>
<td>For reasonably big task, which system will it take more time from start to end – old technique of batch processing or modern technique of time-sharing?</td>
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<td>Swapping of page will be more in which system – batch processing or time-sharing?</td>
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<td>Explain with example the hard and soft Real-Time System.</td>
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<td>10</td>
<td>a</td>
<td>Multi-programming or time-sharing enables more than a single process to apparently execute simultaneously. How is this achieved on a single processor?</td>
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<td>b</td>
<td>What are advantage and disadvantage of distributed operating system?</td>
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1. a) Is OS necessary for a computing system? Explain.

ANS:
* No.
* For small system with very less processing
* For system with single task
* Less complicated system with super loop.

b) Explain 3 layer model for operation of OS with each layer example.

ANS:
* Interaction of OS layer with Hardware layer and Application layer.
* Example of each layer

2. a) Why there are different flavors of OS available even from same vendor?

ANS:
* Two major goals of efficient usage and user convenience are sometime conflicting
* Goals for each flavor are different
* For different types of customers priorities are different (GUI / Command Line)

b) What are considered as resources to be managed by OS?

ANS:
* CPU, Memory, I/O
c) What is meant by overhead of using OS?

ANS:
* Resources required for execution of OS like CPU and Memory.
* These resources are to manage user tasks
* These are overhead as they are not being utilised for user process

3. a) How an executable code be put in different parts of RAM wherever space is available?

ANS:
* Compiler produces executable which are not for absolute location
* Code is with a relative location
* Given a reference location Loader compute the absolute location
* Loader can load in the space available in RAM

b) Explain how stack segment is used for function call.

ANS:
* On function call location of calling function is stored in stack
* Function arguments are put in some location in stack
* Local variables of the called function are created on stack
* After execution of function returns to the calling function as in stack
4. a) What are the segments required for execution of a program and for what purposes those are used?

ANS:
* Text segment – for code
* Data segment – for initialized data
* BSS segment – for uninitialized data like global variable
* Heap segment – for dynamic memory allocation
* Stack segment – for function call and interrupt processing

b) Why security and protection are concern of OS?

ANS:
* OS need to protect user files and operations from others
* Protection is to guard from other user of system
* Security is to guard from externer intervener

5. a) If a program is executing in eternal loop, how OS can snatch control from it?

ANS:
* Interrupts are handled by OS and on each interrupt OS get an opportunity
* Hardware interrupts like timer interrupts provide the opportunity to snatch control
b) Why two modes of CPU operations are required for a system?  

ANS:
* OS need some extra control to manage user tasks
* User having all control can be misused and can be catastrophic
* So CPU has two modes – User mode and Kernel mode
* Privileged instructions can be executed only in Kernel mode

c) What is software interrupt?  

ANS:
* Software interrupts works similar like hardware interrupts
* But it is instruction to be called by program

6. a) Why smaller size cache is required when relatively large amount of RAM is available?  

ANS:
* Cache is faster than RAM helping quick operation
* Cost of cache memory is high

b) What are the components of “State of CPU”?  

ANS:
* GPRs, PSW, PC
c) How software interrupt is different from hardware interrupt?

**ANS:**

* It is not triggered by any external event
* It need to be called by program
* There is no condition of nested software interrupts

7. a) Why Memory Protection is required and how processor supports to achieve that?

**ANS:**

* For protection and isolation from other process
* One process should not access memory associated with other process
* For each process processor is informed with memory bound for it
* Processor check the boundary limit for each access
* On violation is raise an interrupt

b) What is I/O device? Why DMA based I/Os are better?

**ANS:**

* All interface devices associated with processor are I/O devices
* With DMA all data are transferred from source to destination without intervention of CPU
* CPU remains free during the data transfer
* The CPU resource can be utilized during data transfer
8. a) Explain advantages and concerns of Multiprogramming System.

**ANS:**
* CPU and I/O resource can be utilized in parallel
* Better overall performance
* Better turnaround / response time
* Intervention of one program to other program need to be taken care
* DMA and privileged mode operation support is required

b) What are CPU-bound and I/O-bound programs?

**ANS:**
* Where computation is more than I/O operations are called CPU-bound program
* Where I/O operations are more than computation are called I/O-bound program

c) What is Round-Robin Scheduling?

**ANS:**
* Scheduling of processes in a circular sequential way
* Each scheduled for a fixed time slice

9. a) For reasonably big task, which system will it take more time from start to end – old technique of batch processing or modern technique of time-sharing?

**ANS:**
* Time-sharing will take more time as it share with other process
* In Batch processing only one task is in control, so minimum time is required
b) Swapping of page will be more in which system – batch processing or time sharing? Explain.

**ANS:**

* In Batch processing only one task is in control, so swapping is minimum
* In time-sharing as other processes take CPU in between, swapping is more

c) Explain with example the hard and soft Real-Time System.

**ANS:**

* Hard Real-Time – Stringent time constrain otherwise catastrophic failure. Space launcher
* Soft Real-Time – Constrain is there but failure is tolerable. Video playing

10. a) Multi-programming or time-sharing enables more than a single process to apparently execute simultaneously. How is this achieved on a single processor?

**ANS:**

* One process runs on CPU at a time
* After certain time process is removed and another program is given CPU
* Within some time interval all process make progress, so it gives feel of simultaneity
* While removing processor state is saved and while scheduling again those are restored
b) What are advantage and disadvantage of distributed operating system?

**ANS:**

* Computation speed up due to availability of more resources
* Overall reliability increases
* Communication overhead for operations
* System is more complex